

## CONSTRUCTION OF FIBERGLASS WATER TANKS

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FIBERGLASS is excellent for construction of tanks for fresh-water or marine organisms. Its strength and durability allow the construction of a relatively thin-walled, lightweight, easily handled tank that can withstand greater water pressure and more abuse than a heavier, thick-walled, wooden tank of comparable dimensions. Moreover, the ease with which fiberglass can be repaired when broken and its ability to withstand the penetration of marine boring organisms make it well suited for use in the construction of seawater aquaria. Because of these characteristics, we have replaced unsatisfactory redwood tanks in our recirculating seawater system with fiberglass tanks.

We have standardized on the three-ply, 250-gallon container shown in figure 1. Materials and cost estimates for the tank and building form are listed in table 1.

Construction offers no problem to the average handyman. With the form completed, construction time should not exceed 8 hours. Essentially, the labor consists of laminating fiberglass cloth on a wax-coated plywood form. Cloth layers are bonded with polyester resin adhesive.

The resin glue used is a two-part adhesive (liquid resin and liquid catalyst) that must be thoroughly mixed before use. The resin is obtainable as clear liquid or fortified with chopped-up glass fibers. The latter type minimizes "pinhole" troubles when used with fiberglass and therefore is preferred. Hardening time varies with the amount of catalyst used and with room temperature. Instructions for mixing are included with each can of resin. While the

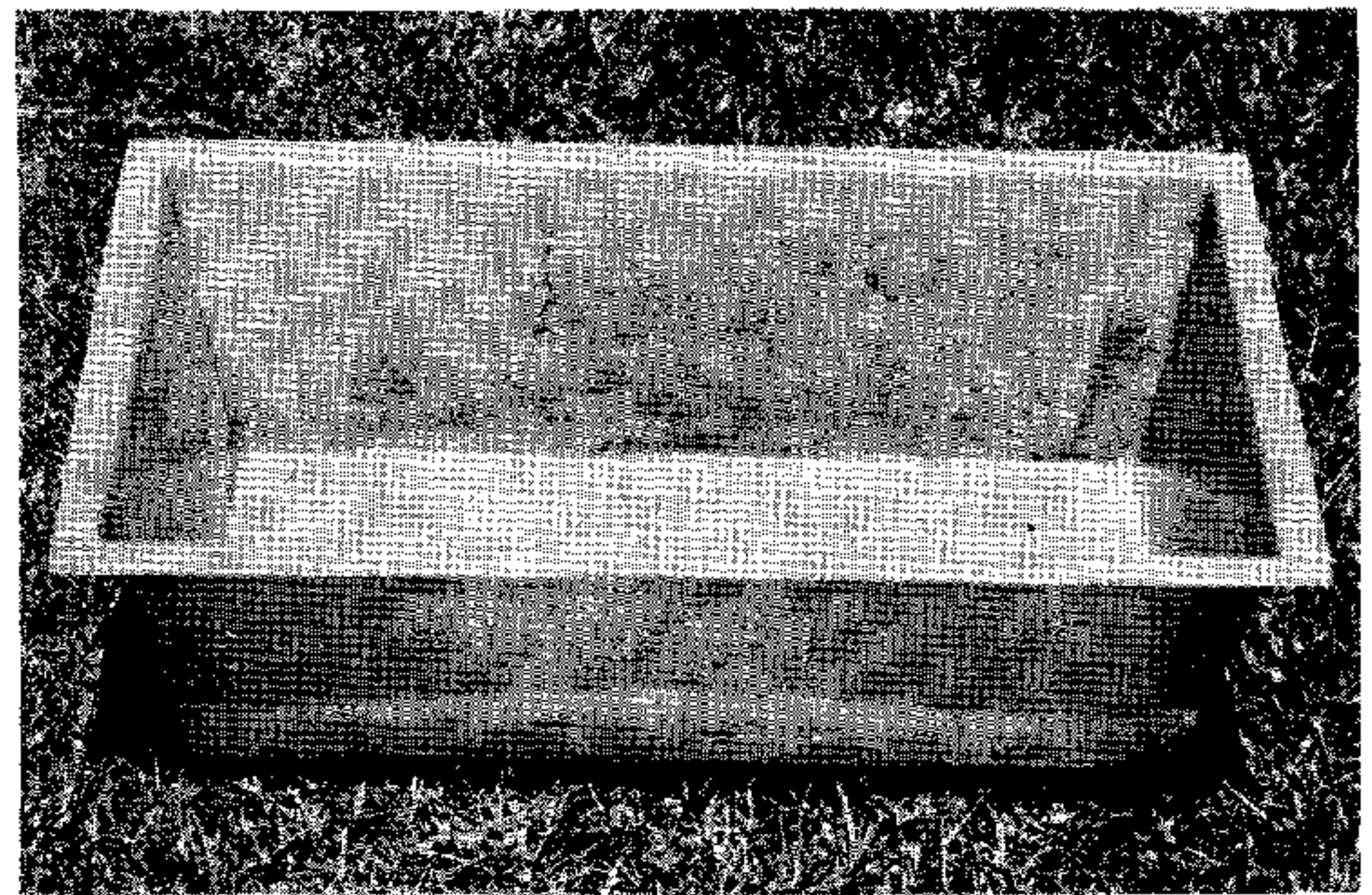


FIGURE 1.--The completed 250-gallon three-ply fiberglass tank.

glue is being mixed, the highly combustible catalyst should be kept away from flame and from contact with skin. After the glue is mixed, fire hazard decreases and toxicity of the catalyst is so reduced that many professional workers spread the mixed resin with their hands instead of with brushes. Acetone is a good solvent and should be kept on hand for cleaning.

Building instructions for the tank form are as follows:

1. Make the tank form out of plywood, designing it so that the finished tank has a flange around the top to provide stiffness. Slope the sides inward somewhat to facilitate removal of the finished tank (figure 2). Sand the form as smooth as possible and round all edges and corners to a radius of about 1/4 inch.

2. Drill a hole through the center of the sides, bottom, and ends of the form so

TABLE 1.--Materials and cost estimates for constructing wooden building form and 250-gallon fiberglass tank

Unit	Materials	Quantity	Cost estimate
Wooden form	Interior plywood, 1/2" x 4' x 8'.	3 sheets-----	\$13.00
	No. 2 yellow pine, 2x4.	19 ft. (lin.)	2.00
	Finishing nails, 4-penny.	1 lb.-----	.20
	Labor-----	6 hr.-----	12.00
			27.20*
Molded tank	Fiberglass cloth, 38".	24 yd.-----	32.00
	Resin-----	4 gal.-----	30.00
	Acetone-----	1 gal.-----	3.00
	Form wax-----	1/2 pt.-----	.15
	Brushes-----	3-----	1.50
	Labor-----	8 hr.-----	16.00
			82.65

\*Prorate over the total number of tanks constructed.

4. Apply the side pieces (figure 2, B) and repeat the painting and smoothing.

5. Reinforce the flange with a 4-inch-wide strip of fiberglass. One inch of this strip will overlap the adjacent sides and ends. Paint and smooth as before.

6. Apply the second and third layers of fiberglass in a similar way. Complete construction by reinforcing the whole flange with a second strip of fiberglass.

7. Separate the tank from the form by applying air pressure to the holes drilled through it. If needed, more holes may be drilled (with care not to injure the tank).

Production may be speeded up by using the finished tank as a building form. In

this case, however, the fiberglass "form" should be coated with a fiberglass-release wax instead of a wood-release wax.

that compressed air can be used to separate the cured or hardened "shell" from the form. During tank construction, cover these holes with masking tape.

3. Apply a good plywood sealer. When it has dried, coat the form with a wood-release wax. If the form has been used and is being prepared for another job, smooth out the wax remaining on the surface with an acetone-soaked rag, and then rewax the whole surface. Never rely on one coat of wax for more than one tank.

Instructions for building a tank (figure 1) on the form (figure 2) are as follows:

1. Cut a piece of fiberglass cloth long enough to cover the tank ends, bottom, and part of the flange extending from the ends. The 38-inch cloth will overlap the bottom and part of the ends (figure 2, A). Stretch the cloth slightly to eliminate wrinkles. The adhesive between the form wax and the cloth will hold the latter in place.

2. Paint the cloth liberally (saturate it) with the thoroughly mixed resin.

3. After the resin has hardened, remove all bubbles, wrinkles, and rough spots with a disk sander. Be careful not to remove form wax during this operation.

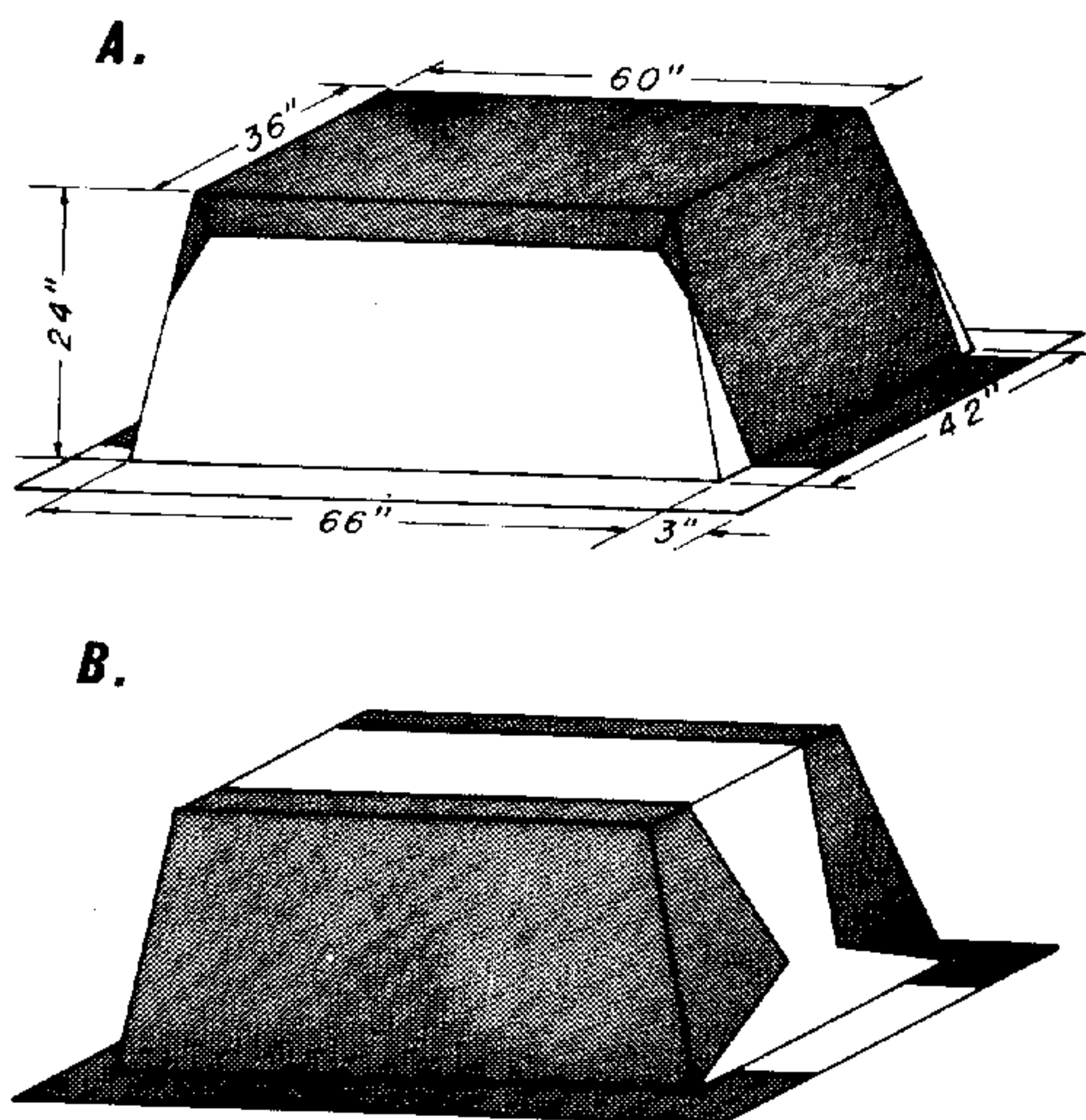


FIGURE 2.--Fiberglass lapping sequence and dimensions of the 250-gallon building form shown in inverted position.